

⑤

$$f(x) = \frac{1}{x}$$

$$f(a) = \frac{1}{a}$$

$$\lim_{x \rightarrow a} \frac{f(x) - f(a)}{x - a}$$

$$\lim_{x \rightarrow a} \frac{\frac{a}{a} \cdot \frac{1}{x} - \frac{1}{a} \cdot \frac{x}{x}}{x - a}$$

 $\Rightarrow$ 

$$\frac{\frac{a}{ax} - \frac{x}{ax}}{x - a}$$

 $\Rightarrow$ 

$$\frac{\frac{a - x}{ax}}{x - a}$$

$$\frac{a - x}{ax} \cdot \frac{1}{x - a}$$

 $\Rightarrow$ 

$$\frac{\cancel{a - x}}{ax} \cdot \frac{1}{-(\cancel{a - x})} = -\frac{1}{ax}$$

$$\Rightarrow \lim_{x \rightarrow a} -\frac{1}{ax}$$

$$= \left( -\frac{1}{a^2} \right)$$

$$\lim_{x \rightarrow a} \frac{f(x) - f(a)}{x - a}$$

(7)

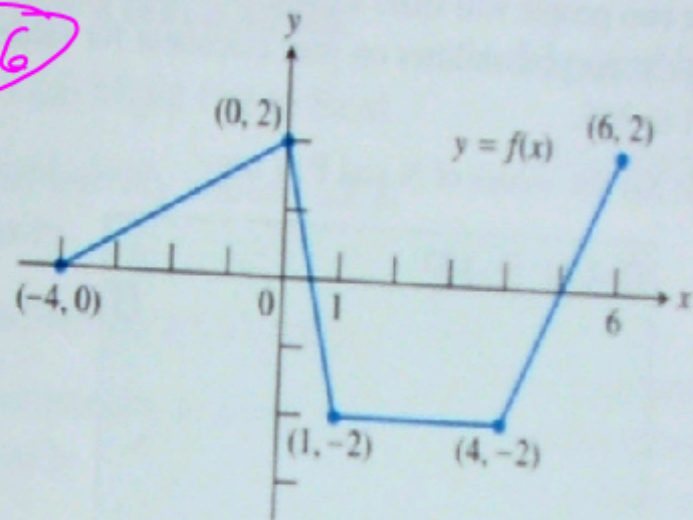
$$\frac{\sqrt{x+1} - \sqrt{a+1}}{x-a} \cdot \frac{\sqrt{x+1} + \sqrt{a+1}}{\sqrt{x+1} + \sqrt{a+1}}$$

$$\frac{x+1 - a - 1}{x-a(\sqrt{x+1} + \sqrt{a+1})} \Rightarrow \frac{x-a}{x-a(\sqrt{x+1} + \sqrt{a+1})}$$

$$\lim_{x \rightarrow a} \frac{1}{\sqrt{x+1} + \sqrt{a+1}} \Rightarrow \frac{1}{2\sqrt{a+1}} \Rightarrow \frac{1}{2\sqrt{4}}$$

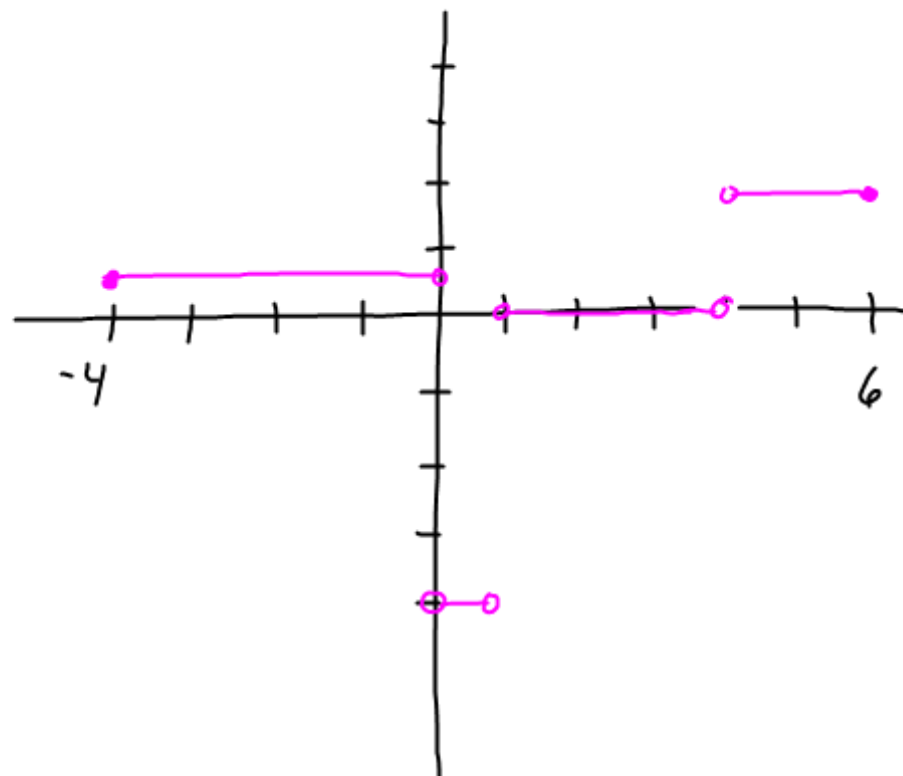
$$\left(\frac{1}{4}\right)$$

#26

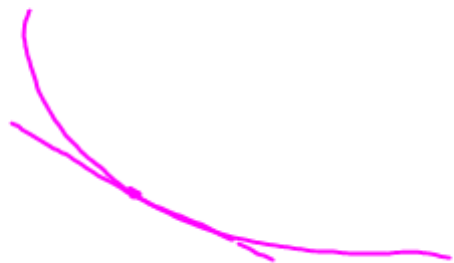


(a) Graph the function's derivative.

(b) At what values of  $x$  between  $x = -4$  and  $x = 6$  is the function not differentiable?  $x = 0, 1, 4$



Derivative  $\rightarrow$  slope



① Find the tangent and normal lines to  $f(x) = x^2 + 4x$

at  $x = -3$

$$y = m(x - x_1) + y_1$$

$$y = -2(x + 3) - 3 \quad (-3, -3)$$

$$y = \frac{1}{2}(x + 3) - 3$$



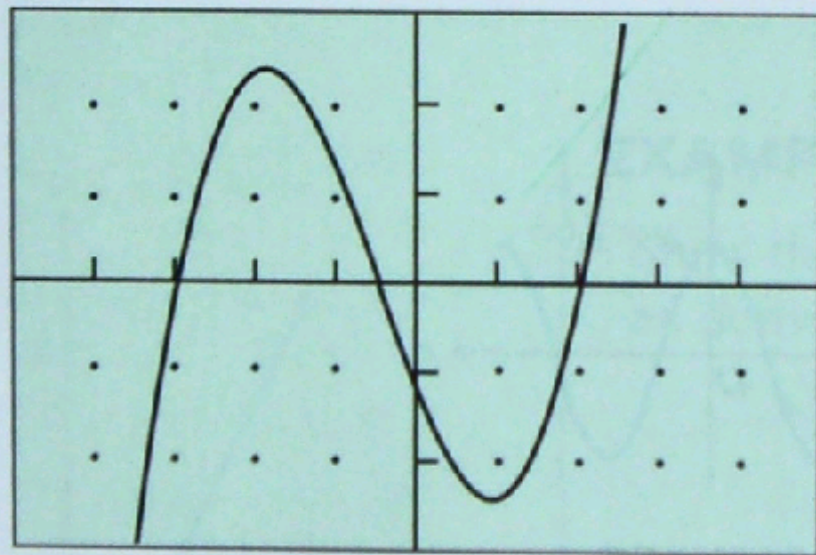
$$f'(x) = 2x + 4$$

$$f'(-3) = \underline{\underline{-2}}$$

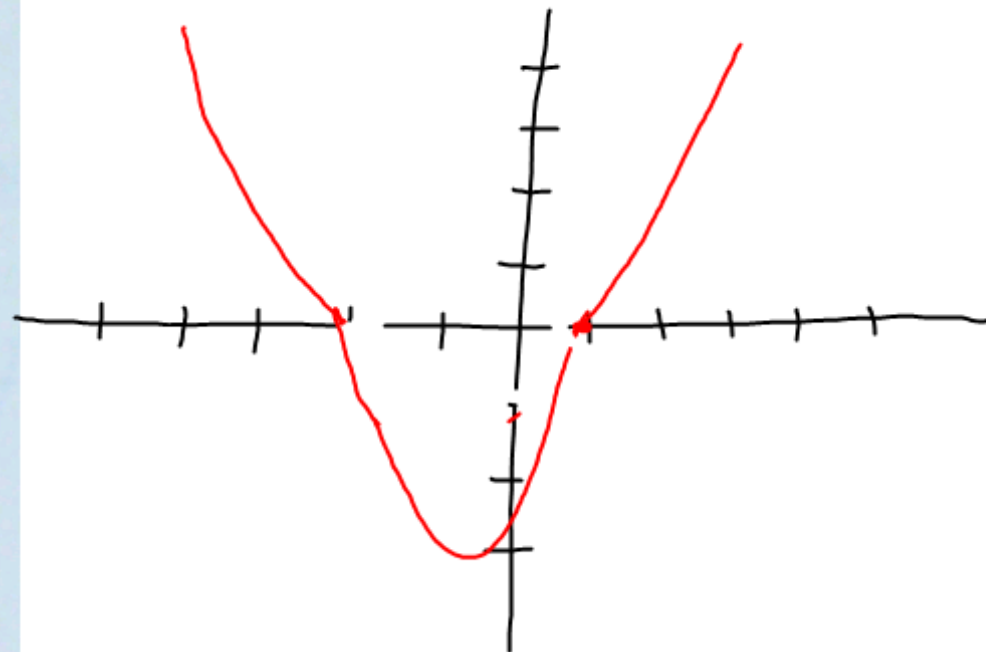
slope  
tangent  
at  $x = -3$

② Do #22 in 3.1

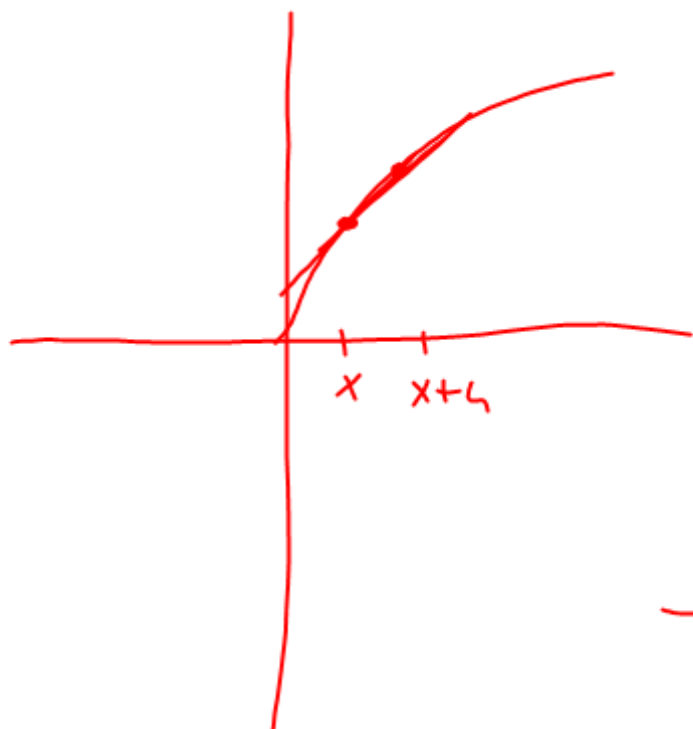




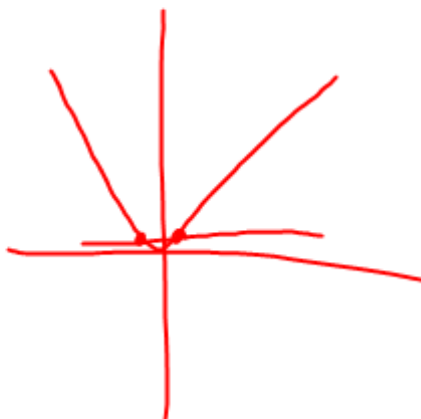
$[-5, 5]$  by  $[-3, 3]$



$$\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$



$$\lim_{h \rightarrow 0} \frac{f(x+h) - f(x-h)}{2h}$$



Sect. 3.2 #1, 4, 5, 8, 10, 12-39 (every mult of 3)